

New F-M flood map looms large: 100-year protection in the works, but mark could be raised

By [Tu-Uyen Tran](#) on Feb 14, 2015 at 10:31 p.m.

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News Alerts

FARGO – Excavators were digging deep into the hole east of City Hall this week as they continued work on a new lift station there and what eventually will be a floodwall from NP Avenue north to the railroad underpass.

Nathan Boerboom, a city engineer involved in the flood protection project, said he expects this relatively short stretch to be done in less than five years, which means the properties protected by it will be ready to be taken out of the Federal Emergency Management Agency's hazard area.



Property owners in hazard areas are required to buy flood insurance and their rates are much higher than owners outside of those areas.

For several other places north of Main Avenue where there are similarly short stretches of dikes, relief may also come within less than five years. For areas farther south, especially the more than 2,000 properties south of Interstate 94, it may take a bit longer.

Moorhead is hoping to get most of its property owners out of the floodplain within two years.

The dikes that both cities have been building along the Red River are doing double duty, both to get properties out of FEMA's hazard area as soon as possible and to function as part of the larger flood diversion project. That project would direct some of the flood water in the Red River to the west and around the metro area and leave some to flow between Fargo and Moorhead.

But there are signs FEMA's floodplain map may not accurately reflect the true risk of flooding despite recently adding a foot to the 100-year flood, which serves as the basis for the agency's hazard area.

Designers of the diversion project with the U.S. Army Corps of Engineers say newer data shows the 100-year flood to be 1.5 to 3 feet higher, affecting many more properties in Fargo and Moorhead than FEMA's map suggests.

FEMA officials agree they will have to remap the metro area to reflect the newer data, though they most likely will wait until the diversion is done – assuming it doesn't take extremely long.

Floodplain could expand

Fargo's current floodplain map shows most of the area south of Interstate 94 will be underwater in a 100-year flood, which FEMA determined will happen when the river level reaches 39.5 feet.

The floodplain map for Moorhead, which is at higher elevation than Fargo, shows flooding along the river and reaching a quarter-mile inland in a few areas, as well as flooding in much of the newly annexed Oakport area to the far north.

But the corps considers a 100-year flood to be one that reaches 41.1 feet. If that were to happen, it could flood large swaths of central and north Fargo, and reach more than a mile inland in a few areas in Moorhead.

Part of the reason for the difference between the two agencies is FEMA used a 2003 corps analysis as the basis for its floodplain map at the request of Fargo city officials, agency spokesman Jerry DeFelice said.

The biggest flood up to that point was the 1997 flood, now known as the area's second-worst flood.

The corps' analysis uses more recent data, including the record-breaking flood of 2009. That flood crested at 40.8 feet, more than a foot higher than the 1997 flood.

Ryan Pietramali, FEMA's regional risk analysis chief, said his agency will have to change its map to reflect that bigger floodplain at some point, but not just yet.

Normally, as the agency funding the National Flood Insurance Program, FEMA would want all property owners who are actually at risk to buy flood insurance and pay a premium reflecting that risk.

However, remapping is a long process and, given the expected progress of the diversion project, FEMA risks finishing a new map just as the project is done. That means more properties will be protected, requiring yet another long and costly remapping.

"I don't plan on doing a full-scale update on the eastern half of Cass County, which includes

Fargo, before the project is done unless for some crazy reason the project never gets built,” Pietramali said.

FEMA, though, is willing to make small changes to take neighborhoods out of the floodplain as project features are completed, he said, meaning the in-town dikes.

Timing of projects

According to Boerboom the shorter dikes downtown, along the El Zagal and Edgewood golf courses won't take very long to complete. But dikes along Rose Coulee and the south end drains have to be longer because there's no high ground to tie them to until they get to the west side of town. Once each dike is done, it will allow large swaths of property from one side of town to the other to be taken out of the floodplain.

Workers won't start on some sections until 2018, though. Construction takes a year or two, and then it takes about another year to prepare the paperwork to ask FEMA to change the floodplain.

Moorhead is further along on its flood protection, with work remaining in areas by the Moorhead Country Club, Woodlawn Park and along Elm Street South and River Drive South.

Assistant City Engineer Tom Trowbridge said the city got a lot of the “easy” sections of dike done and now are tackling tougher ones, by which he means areas where homeowners are refusing buyout offers and leaving gaps in the dikes. In some areas, the city will just have to settle for emergency clay levees, he said, hoping that will be good enough for FEMA to get

the surrounding homes out of the floodplain.

Either way, he said, he'll find out within two years.

Though both cities' dikes are meant to be certified to FEMA's 100-year floodplain, that really means they don't have to do much when the water reaches that level. With emergency levees and sandbagging, they can still fight a bigger flood, even the corps' 100-year flood, according to Boerboom. But as with all flood fights, there is a race against time an element of risk when using temporary barriers.

No crystal ball

Though the 2009 flood was the biggest ever in 113 years of record, it is not considered a 100-year flood.

Not even a 113-year flood.

The term "100-year flood" is a convenient but misleading label for what hydraulic engineers think of as a 1-percent flood, according to Aaron Buesing, the corps' lead hydraulic engineer for the diversion project. That is, every year there is a 1 percent chance such a flood will occur.

There is a well-developed statistical tool called Log-Pearson Type III that takes a set of river flows and produces the probability for different river levels. Buesing said the corps used that tool and calibrated it against flooding in 2010 and 2011 to ensure it fit real-world conditions, and the data that came out says a 1-percent flood will crest at 41.1 feet, a bit higher than the

2009 flood.

Those whose job it is to predict flooding say that theirs is necessarily an inexact science. For all the statistical tools and climate models a modern hydraulic engineer has access to, they are still limited by the amount of data they have.

“We’ve been taking climate and stream flow records for a little over 100 years now, and you think ‘Oh, that’s a lot,’ but when you look at the big picture you realize we haven’t seen anything yet,” said Aldo Vecchia, a statistician with the U.S. Geological Survey in Bismarck.

Studies of rings in ancient trees and mud deep below Devils Lake, for example, show that the region is in one of just five wet periods in the last 5,000 years, according to Vecchia. Yet water-level and water-flow data for the Red River in Fargo go back just 113 years to 1902.

Wet period

Vecchia was one of the water experts tapped by the corps to advise it how to measure flood risk so that it can design a flood-control project big enough to cope with a 100-year flood.

He said the difference between how the corps analyzed flood risk in this project is different from how FEMA analyzed risk for its floodplain map. FEMA tends to look at flooding throughout the entire period of record, but he and other members of the expert panel recommended the corps only consider data from 1942 onward, he said.

That’s the year when river levels in Fargo entered a new pattern in which flooding became more extreme and unpredictable; it’s not out of the question for a couple of dry years to be

followed by a major flood. Some consider this the start of the present wet period, which intensified in the late 1980s.

Typically, statistical analysis gets better with more data and, conversely, worse with less data. But the expert panel argued that using data from the pre-1942 dry period would skew the average and not reflect the true frequency and intensity of flooding during a wet period.

“Even though there’s more uncertainty with a shorter period of record, we felt it was the prudent thing to do so that we design a project that can function well for the worst,” Buesing said, pausing. “I don’t want to say ‘worst’ – We’re being conservative.”

Vecchia said he’s been in the business 30 years and he’s still surprised by the ways of water. “Even now I’m amazed at the variability, the things that happen that you just wouldn’t have thought of.”

Though he predicts that the wet period will continue another 20 to 30 years, he said there’s no way to know if the last few dry winters are just part of the variability or if it’s the start of a dry period. It’ll take 10, 15 years after the fact to know for sure, he said. “Not only can we not predict ahead of time we can’t even know when it happens.”